Hemodialysis International 2015; **19**:447–451

The prevalence of intestinal parasites in hemodialysis patients in Bushehr, Iran

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Abstract

Hemodialysis patients, due to a dysfunction of the immune response, are prone to a variety of opportunistic infections. Studies of intestinal parasitic infections in these patients are limited. Therefore, the present study was performed to determine the prevalence of these infections in patients on hemodialysis in Bushehr. In this cross-sectional study, fecal samples have been collected from all hemodialysis patients who were continuously referred from September 2011 to September 2012 to the dialysis center at Bushehr and tested using routine parasitological methods. From a total of 88 patients studied, 25 patients (28.4%) were infected with one or more intestinal parasites. *Blastocystis hominis* and *Entamoeba coli* with 13.6% and 6.7% prevalence had the highest prevalence among the patients, respectively. The age group 51–70 years had the highest rates of infection. Statistical analysis showed no relationship between sex and the risk of intestinal parasites. Seventeen percent of infected patients showed up with diarrhea and this relationship was statistically significant. Considering the high prevalence of intestinal parasitic infection among hemodialysis patients in Bushehr and also the high probability of infection in these patients, it is recommended that periodic examinations and screening patients during dialysis and before kidney transplantation should be a part of routine medical care.

Key words: Intestinal parasites, hemodialysis, Bushehr, Iran

INTRODUCTION

Despite continuous efforts and programs organized by the World Health Organization (WHO), parasitic infections are one of the obstacles to economic and social development and a major health problem in most countries of the world, particularly in developing countries.[1,2]

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According to the statistics published by the WHO, about 3 billion people worldwide are infected with parasitic infections.[3] Although it is expected that because of the high economic and health conditions in developed countries, these infections are not much of importance, but with the daily increase in the number of patients with immune deficiency, increase organ transplant surgery and chemical and immune-suppressing drugs and radiation therapy, high statistics related to parasitic infection is not unlikely.[4,5]

Compared with healthy people, patients with immune suppressed systems are more vulnerable for parasitic infections. Among these patients, a large group of organ

DOI:10.1111/hdi.12272

transplant recipients, patients taking corticosteroid drugs and chemotherapy, patients with cancer, acquired immune deficiency syndrome (AIDS) patients, and people undergoing radiation therapy as well as patients undergoing hemodialysis can be pointed.[6,7] With more than 95% of kidney damage, accumulation of toxins in the body is increased sufficiently and sustaining life would not be possible without the use of dialysis or kidney transplant.[8] Several reports indicate that populations with renal dysfunction requiring dialysis are rising.[9] The number of hemodialysis patients has doubled since 1990.[9] According to America's renal information, approximately 90% of patients with chronic renal failure are on hemodialysis.[10] The number of patients with kidney complications is increasing significantly time by time. For instance, the number of those patients increased from 14000 in 2007 to 22000 in 2010.[9,10]

Patients with chronic renal failure who are undergoing hemodialysis because of dysfunction and decreased lymphocytes, dysfunction of the complement system and immune responses, including chemotaxis and phagocytosis, have a high probability of suffering from a variety of opportunistic viral and parasitic infections.[11–13] In a study in hemodialysis patients in Isfahan, Iran, the prevalence of intestinal parasitic infections was at 23.9%; the highest infection rate was in persons 51–65 years old with 29.7% incidence. There was a significant relationship between prevalence and age, duration of dialysis, and health status of people in that study.[5]

Considering that the prevalence of intestinal parasitic infections has a high percentage in dialysis patients, it is necessary that doctors and nephrologists should clinically test these patients for intestinal parasitic infections before medication drugs. However, in patients with immune deficiency, due to a decrease in white blood cells, common signs and symptoms of infection such as fever withheld and diagnosis of infection in these patients is difficult; therefore, it seems that identification of parasitic infections relying on special parasitology methods is necessary in these groups.[14] Given that few studies have been performed in this regard in Iran, the present study was conducted to determine the prevalence of intestinal parasitic infections in hemodialysis patients in southwest of Iran, Bushehr.

MATERIALS AND METHODS

This study was confirmed by Bushehr University of Medical Sciences with ethic number: 20.71.7170.

In this cross-sectional study, all the hemodialysis patients in Bushehr were studies because there is just one center for those patients in Bushehr and we had access to all of them in period of September 2011 till September 2012.

After getting permission to conduct research and coordination between the authorities, records were lookup at the hospital dialysis center and through interviews and questionnaires were completed. Questionnaire was designed on demographic information as well as important factors and variables involved in this study. Stool sample container was delivered to each of the subjects. The next day the samples were collected in standard condition transferred to the parasitology laboratory at Bushehr University of Medical Sciences. All samples were tested using direct smear (wet mount and lugol) and, also, to increase the accuracy of the test, the formalin-ether concentration method were used according to the protocol recommended by the WHO. Test results with data from the questionnaires were analyzed using SPSS software version 18 (SPSS Inc., Chicago, IL, USA; version 18).

RESULTS

In this cross-sectional study, all patients undergoing hemodialysis in Bushehr, Iran, were studied for a year. From a total of 88 patients studied, 25 patients (28.4%) were infected with one or more intestinal parasites. *Blastocystis hominis* with 13.6% and then *Entamoeba coli* with 6.7% prevalence had the highest prevalence among the patients, respectively. Of the total cases, 21 cases (23.9%) were infected with only one species of parasite and four people (4.5%) with more than one parasite species. Results of the prevalence of intestinal parasites in hemodialysis patients are given in Table 1 according to the type of parasites.

Table 2 shows the prevalence of intestinal parasites by age and, as implied, the age group 51–70 years had the

Table 1 Distribution of intestinal parasites in hemodialysis patients in Bushehr

Parasite	Frequency	Percentage
Blastocystis hominis	8	9
Entamoeba coli	6	6.7
Giardia lamblia	3	3.4
Endolimax nana	2	2.3
Iodamoeba bütchlii	1	1.2
Taenia saginata	1	1.2
Mixed infection	4	4.6
Noninfection	63	71.6
Total	88	100

Table 2 Distribution of intestinal parasites in hemodialysis patients by age

	Result					
	Negative		Positive			
Age	N	%	N	%	Total	
≤30	12	13.6	1	1.1	13	14.8
31–50	16	18.2	7	8	23	26.1
51–70	25	28.4	14	15.9	39	44.3
>71	10	11.4	3	3.4	13	14.8
Total	63	71.6	25	28.4	88	100

highest rates of infection. However, no significant correlation was found between the incidence of intestinal parasites and age (Table 2).

Forty-six of the patients (52.3%) were male and others (47.7%) were female. Statistical analysis showed no relationship between sex and the risk of infection with intestinal parasites. In Table 3, the prevalence of intestinal parasites in hemodialysis patients is noted by sex.

Sixty-three of the patients studied (71.6%) were urban dwellers and 25 patients (28.4%) were from rural areas. In terms of education levels, patients were divided into three groups: no education (45.5%), low education (36.4%) and secondary education (18.2%). Some other variables such as job, history of contact with animals, clinical symptoms as abdominal pain, appetite, nausea, vomiting, diarrhea and weight loss, and allergies were also analyzed. The tests revealed no significant differences between parasitic infection and abdominal pain, although a significant number of hemodialysis patients infected with intestinal parasites also had abdominal pain at the same time in comparison with those who were not infected (P value = 0.05). Also, 17% of infected patients have diarrhea and this association was statistically significant (P value < 0.03) (Table 4).

DISCUSSION

Immunocompromised patients are more vulnerable to parasitic infections.[5] Patients with chronic renal failure who are on hemodialysis, resulting in dysfunction of the immune response, are also prone to a variety of opportunistic infections.[5,11] Many studies have been conducted on the prevalence of intestinal parasitic infections in immunocompromised patients, especially in AIDS patients; however, in patients who are undergoing dialysis regularly because of chronic kidney failure, these studies are limited.[15–17] In these patients the typical non-specific symptoms, such as fever might not be seen due to the decreased number of white blood cells. Therefore, diagnosis can be difficult; therefore, performing conventional parasitological methods to detect the parasitic infections in this group of patients are crucial.[14] In the present study, the prevalence of intestinal parasites was achieved at 28.4% which is rather remarkable and, because of the specific population, has potential importance. This result has similarity with some studies carried out in other places; in a study conducted in dialysis patients in Isfahan in 2008, the incidence was reported at 23.9%, the

Table 3 Distribution of intestinal parasites in hemodialysis patients by sex

	Result					
	Negative		Positive		Total	
Sex	N	%	N	%	N	%
Male	32	36.4	14	15.9	46	52.3
Female	31	35.2	11	12.5	42	47.7
Total	63	71.6	25	28.4	88	100

Table 4 Distribution of intestinal parasites in hemodialysis patients by some effective factors

	Prevalence				
	Positive		Negative		
Variables	n	%	n	%	P value
Residence					
City	17	19.3	46	52.3	0.42
Village	8	9.1	17	19.3	
Education level					
Illiterate	15	17	25	28.4	
Low literacy	7	8	25	28.4	0.10
Educated	3	3.4	13	14.8	
Abdominal pain					
Yes	12	13.6	17	19.3	0.05
No	13	14.8	46	52.3	
Appetite					
Yes	5	5.7	21	24.1	0.16
No	19	21.8	42	48.3	
Nausea					
Yes	12	13.8	29	33.3	0.60
No	12	13.8	34	39.1	
Diarrhea					
Yes	15	17	19	21.6	<0.03
No	10	11.4	44	50	
Lose weight					
Yes	12	13.6	22	25	0.18
No	13	14.8	41	46.6	
Itch					
Yes	9	10.3	32	36.8	0.19
No	15	17.2	31	35.6	

researcher has suggested clinical tests for these patients before prescribing medicine and also pretransplant as a care program.[5] In another study in 2000 that was conducted on cancer patients receiving chemotherapy, 34% of them were infected with intestinal parasites and fecal specific tests is mentioned as the basic measures to reduce such infections before starting and during chemotherapy.[18] The reported prevalence of intestinal parasites in immunosuppressed patients in Tehran, which was performed in 1998, was at 34.5%.[4] Some studies have reported a higher and lower prevalence than in this study; in a study on dialysis patients, 45.1% of them were infected with various types of intestinal parasites, the authors suggest that routine parasitology tests should be included in these groups.[19] On the other hand, some studies have reported a lower incidence than expected; in a study in patients with malignancy in Hamedan, 16% prevalence was achieved and the main reason for the low incidence in these patients compared with its prevalence in the region is expressed because of the effects of the drugs used in chemotherapy.[20] It seems that observed differences in outcomes are due to differences in study population, study duration, climatic conditions, customs, and culture and dietary habits.

In the present study, *B. hominis* was the most common intestinal parasite as an opportunistic pathogen and it was also the same parasite reported as most common in some other studies on dialysis or immunosuppressed patients.[4,18,19,21] *Blastocystis hominis* is an opportunistic parasite and according to many researchers' recommendations, if the infection is accompanied with clinical symptoms and these symptoms cannot be explained by other factors, it seems medical therapy is necessary in these cases.[4,18] In this review, *E. coli* was identified as the second most common parasite with 6.7% prevalence. Although *E. coli* is a nonpathogenic parasite, however, the high prevalence of this parasite is important as an indicator for poor health, especially in terms of water and food contamination that should be considered.[22] In this study, *Giardia lamblia* is a third common parasite. This parasite is a pathogen and it can be the cause of many gastrointestinal disorders and dyspepsia.[23] Two nonpathogenic protozoan *Endolimax nana* and *Iodamoeba bütchlii* are the next in ranks and as *E. coli* indicate the lack of proper health standards. In this research, protozoan infection rate was much higher than helminthes and the only worm infection reported is *Taenia saginata*. Undoubtedly, some health appropriate measures, such as not using human feces as fertilizer on farms, and health education can be logical justification for reducing the types of worm infections and recent statistics indicate this fact. Although in the present study, statistical analysis did not show a significant relationship between infection with level of education, age, and sex, infection rate in the age group 51–70 years was higher than other age groups. In some similar studies, the highest prevalence was reported in the age group above 50 years.[5,18,20] In a study, infection rates in urban areas is mentioned higher than in rural areas and the author has described that it is because population is higher in urban areas compared with rural areas.[5] In the present study, there was no relationship between the prevalence of infection and residence.

Another variable evaluated in this study includes the relationship between infection and gastrointestinal symptoms, such as some abdominal pain, nausea, diarrhea, appetite, weight loss, and pruritus. Statistical analysis showed that there was a significant relationship between the infection and diarrhea. In a similar study, the highest prevalence of infection was detected in patients with diarrhea, but this relationship was not significant.[5] Of the limitations of this study, the absence of a control group with the experimental group can be noted, which was not possible because of financial restrictions, and it seems that this issue could be due to the lack of significant relationship between infection and some symptoms.

Considering the high prevalence of intestinal parasitic infection among hemodialysis patients in Bushehr, Iran, and also considering the fact that the immune system of these patients has less efficiency to deal with opportunistic infections compared with healthy subjects, it is recommended that periodic examinations and screening patients during dialysis and before kidney transplantation should be a part of routine medical care.

ACKNOWLEDGMENT

The authors are grateful to the Vice-chancellor of Research of Bushehr University of Medical Sciences for the financial support. This study was granted by Bushehr University of Medical Sciences with grant number: 4435.

Manuscript received April 2014; revised December 2014.

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